UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
PARK, EDWARD

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/812,754	XU ET AL.
	Examiner	**Art Unit**	
	EDWARD PARK	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on <u>17 January 2008</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1,3-41 and 45-48</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1,3-41 and 45-48</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>29 March 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   This action is responsive to applicant's amendments and remarks received on 1/17/08.

Claims 1, 3-41, 45-48 are currently pending.

Claim Objections

2.   In response to applicant's amendment of claims 28, 47 and cancellation of claim 43, the

previous claim objections are withdrawn.

        Claim 3 is objected to because of the following informalities: The phrase "method as

recited in claim 2", appears to be a typographical error since claim 2 has been canceled. Claim 3

should be rewritten as "method as recited in claim 1". For examination purposes, claim 3 will

depend from claim 1. Appropriate correction is required.

        Claim 28 is objected to because of the following informalities: The first line "embodied

as instructions on a computer-readable storage medium", appears to be a typographical error.

The phrase in the first line should be deleted. Appropriate correction is required.

        Claim 29 is objected to because of the following informalities: The claim does not end

with a period and appears to be typographical error. A period should be added to the end of

claim 29. Appropriate correction is required.

Claim Rejections - 35 USC § 101

3.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or
> any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and
> requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent
Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV,
reads as follows:

> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element
> which defines structural and functional interrelationships between the computer program and the rest of the
> computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32
> F.3d at 1583-84, 32 USPQ2d at 1035.

> Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or
> the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural
> phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal
> encoded with functional descriptive material falls within any of the categories of patentable subject matter set
> forth in Sec. 101.

> ... a signal does not fall within one of the four statutory classes of Sec. 101.

> ... signal claims are ineligible for patent protection because they do not fall within any of the four
> statutory classes of Sec. 101.

4.   **Claims 27-29, 35-41** are rejected under 35 U.S.C. 101 because the claimed invention is

directed to non-statutory subject matter as follows. Claims 27-29, 35-41 are drawn to functional

descriptive material recorded on a computer readable storage medium. Normally, the claim

would be statutory. However, the specification, at page 30, paragraph 71 defines the claimed

computer readable medium as encompassing statutory media such as a "ROM", "hard drive",

"optical drive", etc, as well as *non-statutory* subject mater such as a modulated data signal such

as a carrier wave or other transport mechanism.

"A transitory, propagating signal ... is not a "process, machine, manufacture, or

composition of matter." Those four categories define the explicit scope and reach of subject

matter patentable under 35 U.S.C. § 101; thus, such a signal cannot be patentable subject

matter." (*In re Petrus A.C.M. Nuijten;* Fed Cir, 2006-1371, 9/20/2007).

Because the full scope of the claim as properly read in light of the disclosure

encompasses non-statutory subject matter, the claim as a whole is non-statutory. The examiner

suggests amending the claim to *include* the disclosed tangible computer readable media, while at

the same time *excluding* the intangible media such as signals, carrier waves, or other transport

mechanism that includes any information delivery media such as a wired network, RF, infrared

or other wireless media. Any amendment to the claim should be commensurate with its

corresponding disclosure.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or
> described as set forth in section 102 of this title, if the differences between the subject
> matter sought to be patented and the prior art are such that the subject matter as a whole
> would have been obvious at the time the invention was made to a person having ordinary
> skill in the art to which said subject matter pertains. Patentability shall not be negatived
> by the manner in which the invention was made.

6.   **Claims 1, 3, 5-14, 16-19, 35-39, 40, 41, 45-48** are rejected under 35 U.S.C. 103(a) as

being unpatentable over Liang et al (IEEE, "Example-based Caricature Generation with

Exaggeration") with Jaakkola et al (Proceedings of the 19999 Conference on AI and Statistics,

"Probabilistic kernel regression models"), and further in view of Massarsky (US 6,385,628 B1).

Regarding **claim 1**, Liang teaches a method, comprising:

receiving a facial image (see abstract, "input face images");

creating a line-drawing from the facial image (see figure 1, 3);

computing a set of semantic facial features from key points of a face in the facial image to describe a geometric shape of the face (see figure 1);

comparing relationships among the semantic facial features to corresponding relationships between unexaggerated and exaggerated features in facial images and associated caricatures (Liang: figure 4);

select some of the semantic facial features for caricature exaggeration and to exaggerate the semantic facial features into exaggerated features, wherein a nonlinear mapping between corresponding unexaggerated and exaggerated features (see figure 8);

generating an exaggerated face by applying maximum likelihood estimation (MLE) to the exaggerated features (see section 4.3, given a new input shape a judgment must be made to which prototype to be used to exaggerate);

morphing the line-drawing into the exaggerated face shape to create a facial caricature (see figure 10);

Liang does not disclose a database of caricatures drawn by an artist; applying a kernel regression; the degree of exaggeration is determined by the kernel regression; and wherein the degree of exaggeration of each feature to be exaggerated is adjustable by a user.

Jaakkola teaches applying a kernel regression; the degree of exaggeration is determined by the kernel regression (Jaakkola: section 4).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang reference to utilize a kernel regression technique as suggested by Jaakkola, to "allow greater flexibility in specifying probabilistic regression models of various complexity levels without fear of local minima" (Jaakkola: section 5).

Massarsky, in the same field of endeavor, teaches a database of caricatures drawn by an

artist (see col. 1, lines 63-67; col. 2, lines 1-19, storing artist's drawing or painting of a

caricature) and wherein the degree of exaggeration of each feature to be exaggerated is

adjustable by a user (see col. 2, lines 30-35, user selects one of the icons which determines the

degree of exaggeration due to the selection).

It would have been obvious at the time the invention was made to one of ordinary skill in

the art to modify the Liang with Jaakkola combination to utilize a database and allow the user to

select the degree of exaggeration as suggested by Massarsky, to modify the parameters in order

for the end-product image to be customized for the user.

Regarding **claim 3**, Liang teaches assigning various weights to the facial images and

associated caricatures based on a similarity to one or more relationships among facial features in

the drawing (Liang: section 3.1, 3.2).

Regarding **claim 5**, Liang teaches constraining the automatic exaggerating of a

relationship among facial features to maintain the facial image within a range of probable faces

(Liang: section 4).

Regarding **claim 6**, Liang teaches wherein the constraining is based on a likelihood that

the exaggerating conforms to allowable exaggerations in the associated caricatures (Liang:

section 4.3).

Regarding **claim 7**, Liang teaches deriving a first map representing differences between

the drawing of the facial image and the facial image after the exaggerating (Liang figure 3);

deriving a second map representing averaged differences between the facial images and their

associated caricatures; and comparing the first map against the second map (Liang: figure 3);

adjusting at least some of the differences in the first map to more closely approximate

corresponding differences in the second map (Liang: figure 3); and adjusting an exaggerated

relationship based on the adjusted first map (Liang: figure 3; section 4).

Regarding **claim 8**, Liang teaches wherein the adjusting at least some of the differences

in the first map to more closely approximate corresponding differences in the second map uses a

maximum likelihood model (Liang: section 4).

Regarding **claim 9**, Liang teaches deriving a map representing differences between the

drawing of the facial image and the facial image after the exaggerating (Liang: figure 3);

selecting one of the associated caricatures based on a similarity to the map (Liang: section 4);

and conforming the exaggerating to the selected caricature (Liang: figure 3), wherein if

exaggeration of a relationship varies beyond a threshold from a corresponding relationship in the

selected caricature, then a degree of the exaggerating is altered to conform the relationship to the

selected caricature (Liang: section 4).

Regarding **claim 10**, Liang teaches wherein the selecting uses a maximum likelihood

technique (Liang: section 4).

Regarding **claim 11**, Liang teaches variably combining the drawing of the facial image

with the selected caricature in order to produce a variably exaggerated caricature of the facial

image (Liang: section 4).

Regarding **claim 12**, Liang teaches selecting a relationship among facial features to

exaggerate based on a variance of the relationship from a norm derived from the facial images in

the database, wherein relationships having relatively high variance from the norm are selected

for exaggeration (Liang: section 4.2).

Regarding **claim 13**, Liang teaches measuring one or more distances representing the relationship among facial features; and comparing the one or more distances with corresponding average distances in the facial images (Liang: section 3.2).

Regarding **claim 14**, Liang, Jaakkola, with Massarsky combination discloses all elements as mentioned above in claim 12. Liang further teaches selecting the relationship for exaggeration if the relationship varies by a threshold from an average for the similar relationships (see section 3.1, 3.2). Liang does not teach performing a kernel regression in order to map the relationship to similar relationships among similar facial features in the facial images.

Jaakkola teaches wherein the comparing is performed at least in part by a kernel regression technique (Jaakkola: section 4).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang, Jaakkola, with Massarsky combination to utilize a kernel regression technique as suggested by Jaakkola, to "allow greater flexibility in specifying probabilistic regression models of various complexity levels without fear of local minima" (Jaakkola: section 5).

Regarding **claim 16**, Liang teaches measuring one or more distances representing the relationship among facial features (Liang: section 3.2); assigning weights to the facial images based on a similarity of the relationship to corresponding relationships among facial features in the facial images, wherein a high weight is assigned to a high similarity (Liang: section 4.4); and selecting the relationship for the exaggerating if one or more distances representing the relationship vary beyond a first threshold from one or more corresponding average distances

among facial features derived from the facial images that are assigned a weight that exceeds a second threshold (Liang: section 4.2).

Regarding **claim 17**, Liang teaches varying a degree of the exaggerating to be applied to a relationship among facial features while constraining the exaggerating in order to maintain the facial image within a range of probable faces (Liang: section 3).

Regarding **claim 18**, Liang, Jaakkola, with Massarsky combination discloses all elements as mentioned above in claim 17. Liang does not teach wherein the degree of the exaggerating is selectable by a user.

Massarsky teaches wherein the degree of the exaggerating is selectable by a user (Massarsky: col. 2, lines 30-35).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang, Jaakkola, with Massarsky combination to allow the user to select the degree of exaggeration as suggested by Massarsky, to modify the parameters in order for the end-product image to be customized for the user.

Regarding **claim 19**, Liang teaches exaggerating one of a shape and a size of a facial feature (Liang; figure 3).

Regarding **claim 35**, Liang teaches a computer readable medium containing instructions that are executable by a computing device to perform actions (Liang: section 6) comprising:

comparing relationships among facial features in a facial image to corresponding relationships in a collection of facial images and associated caricatures (Liang: figure 3); and

exaggerating at least one relationship among facial features in the facial image based on the

comparing (Liang: figure 3). Liang does not disclose exaggerating includes applying a kernel

regression technique and the degree of the exaggerating is user-adjustable.

Jaakkola teaches applying a kernel regression technique (Jaakkola: section 4).

It would have been obvious at the time the invention was made to one of ordinary skill in

the art to modify the Liang reference to utilize a kernel regression technique as suggested by

Jaakkola, to "allow greater flexibility in specifying probabilistic regression models of various

complexity levels without fear of local minima" (Jaakkola: section 5).

Massarsky, in the same field of endeavor, teaches degree of exaggeration is user-adjustable (see

col. 2, lines 30-35, user selects one of the icons which determines the degree of exaggeration due

to the selection).

It would have been obvious at the time the invention was made to one of ordinary skill in

the art to modify the Liang with Jaakkola combination to allow the user to select the degree of

exaggeration as suggested by Massarsky, to modify the parameters in order for the end-product

image to be customized for the user.

Regarding **claim 36**, Liang teaches constrain the exaggerating to maintain the facial

image within a range of probable faces (Liang: section 4).

Regarding **claim 37**, Liang teaches derive a map representing differences between the

facial image and the facial image after the exaggerating (Liang: figure 3; section 4); select a

caricature from the collection based on a similarity to the map (Liang: figure 3); and conform the

exaggerating to the caricature, wherein if exaggeration of a relationship varies beyond a

threshold from a corresponding relationship in the caricature, then a degree of the exaggerating is altered to conform the relationship to the caricature (Liang: figure 3; section 4).

Regarding **claim 38**, Liang teaches wherein the selecting includes a maximum likelihood technique (Liang: section 4).

Regarding **claim 39**, Liang teaches combine the facial image with the caricature in order to produce a variably exaggerated caricature of the facial image (Liang: section 4).

Regarding **claim 40**, Liang, Jaakkola, with Massarsky combination discloses all elements as mentioned above in claim 35. Liang further teaches assigning various weights to the facial images and associated caricatures based on a similarity to one or more relationships among facial features in the drawing (Liang: section 3.1, 3.2). Liang does not teach comparing using a kernel regression technique.

Jaakkola teaches comparing using a kernel regression technique (Jaakkola: section 4).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang, Jaakkola, with Massarsky combination to utilize a kernel regression technique as suggested by Jaakkola, to "allow greater flexibility in specifying probabilistic regression models of various complexity levels without fear of local minima" (Jaakkola: section 5).

Regarding **claim 41**, Liang, Jaakkola, with Massarsky combination discloses all elements as mentioned above in claim 35. Liang further teaches constraining the exaggerating in order to maintain the facial image within a range of probable faces (Liang: section 4). Liang does not teach allowing a user to vary a degree of the exaggerating to be applied to a relationship among facial features.

Massarsky teaches allowing a user to vary a degree of the exaggerating to be applied to a

relationship among facial features (Massarsky: col. 2, lines 30-35).

It would have been obvious at the time the invention was made to one of ordinary skill in

the art to modify the Liang, Jaakkola, with Massarsky combination to allow the user to select the

degree of exaggeration as suggested by Massarsky, to modify the parameters in order for the

end-product image to be customized for the user.

Regarding **claim 45**, Liang teaches an automated method, comprising:

collecting pairs of facial images, wherein each pair includes an unexaggerated facial image and a

caricature of the unexaggerated facial image (Liang: figure 3);

receiving a facial drawing to compare with the pairs of facial images (Liang: figure 3);

iteratively comparing characteristics of the facial drawing with characteristics in the pairs

(Liang: figure 3); and

selecting one of the pairs as a model for variably exaggerating at least part of the facial

drawing (Liang: figure 3). Liang does not disclose utilizing a kernel regression technique and a

degree of variable exaggeration is user-adjustable.

Jaakkola teaches utilizing a kernel regression technique (Jaakkola: section 4).

It would have been obvious at the time the invention was made to one of ordinary skill in

the art to modify the Liang reference to utilize a kernel regression technique as suggested by

Jaakkola, to "allow greater flexibility in specifying probabilistic regression models of various

complexity levels without fear of local minima" (Jaakkola: section 5).

Massarsky, in the same field of endeavor, teaches degree of exaggeration is user-adjustable (see col. 2, lines 30-35, user selects one of the icons which determines the degree of exaggeration due to the selection).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang with Jaakkola combination to allow the user to select the degree of exaggeration as suggested by Massarsky, to modify the parameters in order for the end-product image to be customized for the user.

Regarding **claim 46**, Liang teaches wherein the characteristics include relationships among facial features in the facial drawing (Liang: section 6).

Regarding **claim 47**, Liang, Jaakkola, with Massarsky combination discloses all elements as mentioned above in claim 45. Liang does not teach wherein the iterative comparing uses a kernel reduction technique.

Jaakkola teaches wherein the iterative comparing uses a kernel regression technique (Jaakkola: section 4).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang, Jaakkola, with Massarsky combination to utilize a kernel regression technique as suggested by Jaakkola, to "allow greater flexibility in specifying probabilistic regression models of various complexity levels without fear of local minima" (Jaakkola: section 5).

Regarding **claim 48**, Liang teaches wherein the iterative comparing constrains the variable exaggeration of a relationship among facial features in the facial drawing to a degree of

exaggeration of a corresponding relationship in the model ("exaggeration directions and

degrees"; Liang: section 3, 4).

7.   **Claims 25, 28, 30, 31, 33, 34** are rejected under 35 U.S.C. 103(a) as being unpatentable

over Liang et al (IEEE, "Example-based Caricature Generation with Exaggeration") with

Massarsky (US 6,385,628 B1), and further in view of Jaakkola et al (Proceedings of the 19999

Conference on AI and Statistics, "Probabilistic kernel regression models").

        Regarding **claim 25**, Liang with Massarsky combination discloses all elements as

mentioned above in claim 20. Liang further teaches assigning various weights to the facial

images and associated caricatures based on a similarity to one or more relationships among facial

features in the drawing (Liang: section 3.1, 3.2). Liang does not teach wherein the means for

comparing includes means for performing a kernel regression technique.

        Jaakkola teaches wherein the means for comparing includes means for performing a

kernel regression technique (Jaakkola: section 4).

        It would have been obvious at the time the invention was made to one of ordinary skill in

the art to modify the Liang with Massarsky combination to utilize a kernel regression technique

as suggested by Jaakkola, to "allow greater flexibility in specifying probabilistic regression

models of various complexity levels without fear of local minima" (Jaakkola: section 5).

        Regarding **claim 28**, Liang with Massarsky combination discloses all elements as

mentioned above in claim 27. Liang teaches to compare the facial features and relationships in

the facial image to facial features and relationships in the collection (Liang: figure 3, section 3.1,

3.2).

        Jaakkola teaches applying a kernel regression technique (Jaakkola: section 4).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang with Massarsky combination to utilize a kernel regression technique as suggested by Jaakkola, to "allow greater flexibility in specifying probabilistic regression models of various complexity levels without fear of local minima" (Jaakkola: section 5).

Regarding **claim 30**, Liang teaches a first area to depict a facial image; a second area to depict variably exaggerated facial features and relationships among the facial features of the facial image; a third area to depict a caricature of the facial image (Liang: figure 11); and a variable exaggeration controller to control a degree of variable exaggeration applied to one or more facial features and relationships in the facial image (Liang: section 3); receiving a facial image (see abstract, "input face images");

creating a line-drawing from the facial image (see figure 1, 3);

computing a set of semantic facial features from key points of a face in the facial image to describe a geometric shape of the face (see figure 1);

comparing relationships among the semantic facial features to corresponding relationships between unexaggerated and exaggerated features in facial images and associated caricatures (Liang: figure 4);

select some of the semantic facial features for caricature exaggeration and to exaggerate the semantic facial features into exaggerated features, wherein a nonlinear mapping between corresponding unexaggerated and exaggerated features (see figure 8);

generating an exaggerated face by applying maximum likelihood estimation (MLE) to the exaggerated features (see section 4.3, given a new input shape a judgment must be made to which prototype to be used to exaggerate);

morphing the line-drawing into the exaggerated face shape to create a facial caricature (see figure 10);

Liang does not teach a display area; a database of caricatures drawn by an artist; applying a kernel regression; the degree of exaggeration is determined by the kernel regression; and wherein the degree of exaggeration of each feature to be exaggerated is adjustable by a user.

Massarsky, in the same field of endeavor, teaches a display area (see figure 2a, 18a); a database of caricatures drawn by an artist (see col. 1, lines 63-67; col. 2, lines 1-19, storing artist's drawing or painting of a caricature) and wherein the degree of exaggeration of each feature to be exaggerated is adjustable by a user (see col. 2, lines 30-35, user selects one of the icons which determines the degree of exaggeration due to the selection).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang reference to utilize a display area, a database and allow the user to select the degree of exaggeration as suggested by Massarsky, to allow the user to visually see the transformation of the user's image before and after caricature processing and modify the parameters in order for the end-product image to be customized for the user.

Jaakkola teaches applying a kernel regression; the degree of exaggeration is determined by the kernel regression (Jaakkola: section 4).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang with Massarsky combination to utilize a kernel regression technique as suggested by Jaakkola, to "allow greater flexibility in specifying probabilistic regression models of various complexity levels without fear of local minima" (Jaakkola: section 5).

Regarding **claim 31**, Liang teaches first, second, and third display areas are shown simultaneously (Liang: figure 11).

Regarding **claims 33 and 34**, Liang, Massarsky, with Jaakkola combination discloses all elements as mention above in claim 30. Liang does not teach manually adjusting a size of a single feature or relationship and manually changing a shape of a facial feature in one of the display windows.

Massarsky teaches manually adjusting a size of a single feature or relationship (Massarsky: col. 2, lines 30-39) and manually changing a shape of a facial feature in one of the display windows (Massarsky: col. 2, lines 30-39).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang, Massarsky, with Jaakkola combination to manually adjust as suggested by Massarsky, to allow the user to customize the caricature to the user's preference.

8.   **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Liang et al (IEEE, "Example-based Caricature Generation with Exaggeration"), Jaakkola et al (Proceedings of the 1999 Conference on AI and Statistics, "Probabilistic kernel regression models"), with Massarsky (US 6,385,628 B1) and further in view of Taylor et al (US 7,095,878 B1).

Regarding **claim 15**, Liang, Jaakkola, with Massarsky combination discloses all elements as mentioned above in claim 12. Liang further teaches assigning weights to the facial images based on a similarity of the relationship to corresponding relationships among facial features in the facial images, wherein a high weight is assigned to a high similarity (Liang: section 3.1, 3.2). Liang does not teach wherein the selecting a relationship includes performing a kernel regression

in order to map the relationship to similar relationships among similar facial features in the facial images and applying a linear regression to the weighted facial images.

Jaakkola teaches wherein the selecting a relationship includes performing a kernel regression (Jaakkola: section 5).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang, Jaakkola, with Massarsky combination to utilize a kernel regression as suggested by Jaakkola, to "allow greater flexibility in specifying probabilistic regression models of various complexity levels without fear of local minima" (Jaakkola: section 5).

Taylor teaches applying a linear regression (Taylor: col. 11, lines 15-35).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang, Jaakkola, with Massarsky combination to utilize a linear regression as suggested by Taylor, to increase the reliability of comparing the relationships between similar facial features.

9.   **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Liang et al (IEEE, "Example-based Caricature Generation with Exaggeration"), Jaakkola et al (Proceedings of the 1999 Conference on AI and Statistics, "Probabilistic kernel regression models"), with Massarsky (US 6,385,628 B1), and further in view of Tal (US 4,975,969).

Regarding **claim 4**, Liang, Jaakkola, with Massarsky combination discloses all elements as mentioned above in claim 1. Liang further teaches wherein creating a drawing includes rendering the facial image into a set of points (Liang: figure 3). Liang does not teach wherein at least some of the points describe at least some of the facial feature and wherein at least some distances between the points represent at least one relationship among facial feature.

Tal teaches wherein at least some of the points describe at least some of the facial feature and wherein at least some distances between the points represent at least one relationship among facial feature (col. 3, lines 20-40).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang, Jaakkola, with Massarsky combination to represent at least one relationship from the distances as suggested by Jaakkola, to accurately distinguish one user from the next in order to increase the reliability of the exaggerations.

10.   **Claims 20-24, 26, 27, 29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Liang et al (IEEE, "Example-based Caricature Generation with Exaggeration") in view of Massarsky (US 6,385,628 B1).

Regarding **claim 20**, Liang teaches a system, comprising:

means for rendering a facial image into a drawing (Liang: figure 3);

means for comparing relationships among facial features in the drawing to corresponding relationships in facial images and associated caricatures (Liang: figure 4); and

means for exaggerating at least one relationship among facial features in the drawing based on the corresponding relationships in the facial images and associated caricatures (Liang: section 4). Liang does not disclose a database of facial images and corresponding characters drawn by an artist and wherein a degree of exaggeration for each facial feature to be exaggerated is user-adjustable.

Massarsky, in the same field of endeavor, teaches a database of facial images and corresponding characters drawn by an artist (see col. 1, lines 63-67; col. 2, lines 1-19, storing artist's drawing or painting of a caricature) and wherein a degree of exaggeration for each facial

feature to be exaggerated is user-adjustable (see col. 2, lines 30-35, user selects one of the icons which determines the degree of exaggeration due to the selection).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang reference to utilize a database and allow the user to select the degree of exaggeration as suggested by Massarsky, to modify the parameters in order for the end-product image to be customized for the user.

Regarding **claim 21**, Liang teaches constraining the exaggerating to maintain the facial image of the drawing within a range of probable faces (Liang: section 4).

Regarding **claim 22**, Liang teaches deriving a map representing differences between the drawing of the facial image and the facial image after the exaggerating; means for selecting one of the associated caricatures based on a similarity to the map; and means for conforming the exaggerating to the caricature (Liang: section 4).

Regarding **claim 23**, Liang teaches wherein the means for selecting includes means for performing a maximum likelihood technique (Liang: section 4).

Regarding **claim 24**, Liang teaches variably combining the drawing of the facial image with the selected caricature in order to produce a variably exaggerated caricature of the facial image in the drawing (Liang: section 4).

Regarding **claim 26**, Liang teaches varying a degree of the exaggerating to be applied to a relationship among facial features while constraining the exaggerating in order to maintain the facial image within a range of probable faces ("exaggeration degree"; Liang: section 3.2).

Regarding **claim 27**, Liang teaches a caricature engine embodied as instructions on a computer-readable storage medium (see section 6), comprising:

a facial features and relationships locator to receive a facial image and locate a set of

facial features and relationships among facial features in the facial image (Liang: figure 3);

an exaggeration engine to compare the facial features and relationships in the facial

image to facial features and relationships in a collection of pairs of facial images and associated

caricatures in order to determine which of the facial features and relationships to exaggerate in

the facial image (Liang: figure 3); and

an exaggeration constraint engine to compare exaggerations applied to the facial image

with at least one selected caricature from the associated caricatures in order to conform a degree

of the exaggerations to the at least one selected caricature (Liang: figure 3). Liang does not

disclose a database and wherein a degree of exaggeration for each facial feature to be

exaggerated is user-adjustable.

Massarsky, in the same field of endeavor, teaches a database (see col. 1, lines 63-67; col.

2, lines 1-19, storing artist's drawing or painting of a caricature) and wherein a degree of

exaggeration for each facial feature to be exaggerated is user-adjustable (see col. 2, lines 30-35,

user selects one of the icons which determines the degree of exaggeration due to the selection).

It would have been obvious at the time the invention was made to one of ordinary skill in

the art to modify the Liang reference to utilize a database and allow the user to select the degree

of exaggeration as suggested by Massarsky, to modify the parameters in order for the end-

product image to be customized for the user.

Regarding **claim 29**, Liang teaches a variable warping engine to variably combine the

facial image with the at least one selected caricature in order to produce a variably exaggerated

caricature of the facial image (Liang: figure 3), while maintaining the variably combined facial image and caricature within a range of probable faces (Liang: section 3).

11.   **Claim 32** is rejected under 35 U.S.C. 103(a) as being unpatentable over Liang et al (IEEE, "Example-based Caricature Generation with Exaggeration"), Massarsky (US 6,385,628 B1), with Jaakkola et al (Proceedings of the 19999 Conference on AI and Statistics, "Probabilistic kernel regression models"), and further in view of Harville et al (US 7,149,961 B2).

        Regarding **claim 32**, Liang discloses all elements as mentioned above in claim 30. Liang does not teach a selectable list of facial features and relationships to be selected for variable exaggeration.

        Harville teaches a selectable list of features and relationships to be selected ("user-selectable parameters"; Harville: col. 29, lines 46-50).

        It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Liang reference to utilize a selectable list as suggested by Harville, to allow the user to customize the type of caricature that the user prefers to create.

Response to Arguments

12.   Applicant's arguments filed on 1/17/08, in regards to **claims 27-29 and 35-41** have been fully considered but they are not persuasive. Applicant argues that the addition of the phrase, "storage", into the claim language overcomes the 101 rejection. This argument is not considered persuasive since the specification defines a computer-readable storage medium to be considered a carrier wave, which is non-statutory subject matter. See above 101 rejection.

Applicant's arguments with respect to **claim 1** have been considered but are moot in view of the new ground(s) of rejection.

In regards to **claims 5-13, 16, 17, 19**, applicant argues that the claims are allowable due to dependency of claim 1. This argument is not considered persuasive since claim 1 still stands rejected and the rejection can be seen above.

Applicant's arguments with respect to **claim 20** have been considered but are moot in view of the new ground(s) of rejection.

In regards to **claims 21-24, 26**, applicant argues that the claims are allowable due to dependency of claim 20. This argument is not considered persuasive since claim 20 still stands rejected and the rejection can be seen above.

Applicant's arguments with respect to **claim 27** have been considered but are moot in view of the new ground(s) of rejection.

In regards to **claim 29**, applicant argues that the claims are allowable due to dependency of claim 27. This argument is not considered persuasive since claim 27 still stands rejected and the rejection can be seen above.

Applicant's arguments with respect to **claim 35** have been considered but are moot in view of the new ground(s) of rejection.

In regards to **claim 36-39,** applicant argues that the claims are allowable due to dependency of claim 35. This argument is not considered persuasive since claim 35 still stands rejected and the rejection can be seen above.

Applicant's arguments with respect to **claim 45** have been considered but are moot in view of the new ground(s) of rejection.

In regards to **claim 46, 48,** applicant argues that the claims are allowable due to dependency of claim 45. This argument is not considered persuasive since claim 45 still stands rejected and the rejection can be seen above.

In regards to **claim 3**, applicant argues that the claimed limitation is not taught in the reference. Examiner agrees that the previous section quoted in the first office action does not teach a portion of the claim and the examiner inadvertently pointed to the wrong section in the Liang reference. Regardless, the claim limitation is met and disclosed in another section of the Liang reference; see above rejection of claim 3.

In regards to **claim 14**, applicant argues that the claim limitation is not taught in the reference. Examiner agrees that the previous section quoted in the first office action does not teach a portion of the claim and the examiner inadvertently pointed to the wrong section in the Liang reference. Regardless, the claim limitation is met by the primary reference and disclosed in another section of the Liang reference; see above rejection of claim 14. Furthermore, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In regards to **claim 25**, applicant argues that the claim limitation is not taught in the reference. Examiner agrees that the previous section quoted in the first office action does not teach a portion of the claim and the examiner inadvertently pointed to the wrong section in the Liang reference. Regardless, the claim limitation is met by the primary reference and disclosed in another section of the Liang reference; see above rejection of claim 25. Furthermore, in

response to applicant's arguments against the references individually, one cannot show

nonobviousness by attacking references individually where the rejections are based on

combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re*

Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In regards to **claim 28**, applicant argues that the claim limitation is not taught by either

reference. This argument is not considered persuasive since the claim limitation is met by the

combination of the three references. In response to applicant's arguments against the references

individually, one cannot show nonobviousness by attacking references individually where the

rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208

USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In regards to **claim 40**, applicant argues that the claim limitation is not taught in the

reference. Examiner agrees that the previous section quoted in the first office action does not

teach a portion of the claim and the examiner inadvertently pointed to the wrong section in the

Liang reference. Regardless, the claim limitation is met by the primary reference and disclosed

in another section of the Liang reference; see above rejection of claim 40. Furthermore, in

response to applicant's arguments against the references individually, one cannot show

nonobviousness by attacking references individually where the rejections are based on

combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re*

Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In regards to **claim 48**, applicant argues that the claim limitation is not taught in the

reference. This argument is not considered persuasive since it can be seen in Liang that the

claim limitation is met by the reference as shown above.

In regards to **claim 15**, applicant argues that the claim limitation is not taught in the reference. Examiner agrees that the previous section quoted in the first office action does not teach a portion of the claim and the examiner inadvertently pointed to the wrong section in the Liang reference. Regardless, the claim limitation is met by the primary reference and disclosed in another section of the Liang reference; see above rejection of claim 15. Furthermore, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In regards to **claim 4**, in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it would be obvious to bring in the concept of Tal to combine with the Liang, Jaakkola, with Massarsky combination, and the rejection can be seen above.

In regards to **claim 18**, applicant argues that the claim limitation is not met by Liang reference. Applicant argues that Liang does not show that user can adjust he magnitude of exaggeration applied. This argument is not persuasive since it is Massarsky that meets the limitation of the claim. Applicant further argues that Massarsky does not teach the limitation

when the applicant admits that the user can choose from the drawing icons, which inherently

allows the user to select the degree of exaggeration.

Applicant's arguments with respect to **claim 30** have been considered but are moot in

view of the new ground(s) of rejection.

In regards to **claim 31**, applicant argues that Liang does not represent display areas of a

user interface device. In response to applicant's arguments, the recitation, "user interface" has

not been given patentable weight because the recitation occurs in the preamble. A preamble is

generally not accorded any patentable weight where it merely recites the purpose of a process or

the intended use of a structure, and where the body of the claim does not depend on the preamble

for completeness but, instead, the process steps or structural limitations are able to stand alone.

See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150,

152, 88 USPQ 478, 481 (CCPA 1951). Furthermore, it can be seen that there is a first, second,

third display area that are shown simultaneously, in figure 11.

In regards to **claim 33, 34**, applicant argues that the claim limitation is not met. This

argument is not considered persuasive since in col. 2, lines 30-39, a user is able to choose a

drawing icon and further instruction create a caricature that includes division of the fixed image

into a plurality of separate image areas.

In regards to **claim 41**, applicant argues that the claim limitations are not met by the

references. This argument is not considered persuasive since Massarsky discloses the claim

limitation by having the user select an icon which changes the degree of exaggeration which in

essence meets the limitation of claim.

In regards to **claim 32**, applicant argues that the claim limitations are not met by the

Harville reference. This argument is not considered persuasive since the Harville reference is

utilized to bring in the concept of a selectable list, no more or less. In combination with the other

references, it is utilized to meet the limitations of the claim as so above. In response to

applicant's arguments against the references individually, one cannot show nonobviousness by

attacking references individually where the rejections are based on combinations of references.

See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091,

231 USPQ 375 (Fed. Cir. 1986).

Conclusion

13.   Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this

final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDWARD PARK whose telephone number is (571)270-1576. The examiner can normally be reached on M-F 10:30 - 20:00, (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571) 272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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